PATENT COOPERATION TREATY

	From the INTERNATIONAL BUREAU
PCT	То:
NOTIFICATION OF ELECTION (PCT Rule 61.2)	Commissioner US Department of Commerce United States Patent and Trademark Office, PCT 2011 South Clark Place Room CP2/5C24 Arlington, VA 22202
Date of mailing (day/month/year) 23 April 2001 (23.04.01)	ETATS-UNIS D'AMERIQUE in its capacity as elected Office
International application No.	
PCT/AU00/01053	Applicant's or agent's file reference FP13346
International filing date (day/month/year)	Priority date (day/month/year)
05 September 2000 (05.09.00)	12 October 1999 (12.10.99)
Applicant	
TAPANES, Edward, E. et al	
The designated Office is hereby notified of its election made: X in the demand filed with the International Preliminary	Examining Authority on: (13.03.01) tional Bureau on:

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland

Authorized officer

Nestor Santesso

Telephone No.: (41-22) 338.83.38

Facsimile No.: (41-22) 740.14.35

The demand must be filed directly with	the competent International Preliminary Examining Authori	ty or, if two or more Authorities are competent,
with the one chosen by the applicant.	Il name or two-letter code of that Authority may be in	by the applicant on the line below:

IPEA/

PCT

CHAPTER II

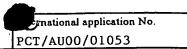
DEMAND

under Article 31 of the Patent Cooperation Treaty:

The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

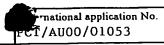
For International Preliminary Examining Authority use only				
Identification of IPEA		Date of receipt of DEMAND		
Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION			Applicant's or agent's file reference	
International application No.	International filing date	(day/month/year)	(Earliest) Priority date (day/month/year)	
PCT/AU00/01053	05/09/00		12/10/99	
Title of invention A method for weighing v	vehicles in mot	ion and syste	ms formed for that purpose.	
Box No. II APPLICANT(S)				
Name and address: (Family name followed by g The address must include po	given name; for a legal entity,	full official designation.	Telephone No.:	
The tata ess musi meane po			+ 3 9764 3088	
Future Fibre Technolog	ies Pty L'td		Facsimile No.:	
20 Viewtech Place	170		+ 3 9764 3099	
Rowville, Victoria, 3 AUSTRALIA	1/8		Teleprinter No.:	
State (that is, country) of nationality: AUSTRALIA		State (that is, country	y) of residence:	
	iven name: for a legal entity for	AUSTRALIA	address must include postal code and name of country.)	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) Arab Transport Research Ltd 500 Burwood Highway Vermont South Victoria 3133 AUSTRALIA				
State (that is, country) of nationality: State (the		State (that is, country	ste (that is, country) of residence:	
AUSTRALIA AUSTRALIA				
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) TAPANES, Edward E 20 Viewtech Place Rowville, Victoria, 3178 AUSTRALIA				
State (that is, country) of nationality: AUSTRALIA		State (that is, country) AUSTRALIA	of residence:	
X Further applicants are indicated on a continuation sheet.				





Continuation of Box No. II APPLICANT(S)			
If none of the following sub-boxes is used, this sheet should not be included in the demand			
Name and address: Family name followed by given name; for a legal entity, for a legal	ull official designation. The address must include postal code and name of country.)		
State (that is, country) of nationality: AUSTRALIA	State (that is, country) of residence: AUSTRALIA		
Name and address: (Family name followed by given name; for a legal entity, for BUCKMASTER, Rodney 500 Burwood Highway Vermont South, Victoria, 3133 AUSTRALIA	ull official designation. The address must include postal code and name of country.)		
State (that is, country) of nationality: AUSTRALIA	State (that is, country) of residence: AUSTRALIA		
Name and address: (Family name followed by given name; for a legal entity, fu			
State (that is, country) of nationality:	State (that is, country) of residence:		
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)			
State (that is, country) of nationality:	State (that is, country) of residence:		
Further applicants are indicated on another continuation sheet.			

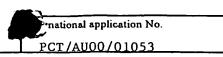




Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE				
The following person is X agent common representative				
and X has been appointed earlier and represents the applicant(s) also for international pre-	liminary examination.			
is hereby appointed and any earlier appointment of (an) agent(s)/common represer				
is hereby appointed, specifically for the procedure before the International Prelimithe agent(s)/common representative appointed earlier.	nary Examining Authority, in addition to			
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)	Telephone No.:			
WILSON, Stephen Henry	+61 3 9243 8300			
GRIFFITH HACK	Facsimile No.:			
509 St Kilda Road	+61 3 9243 8333			
Melbourne Victoria 3004	Teleprinter No.:			
AUSTRALIA .	reichimer No			
	presentative is/has been appointed and the			
Address for correspondence: Mark this check-box where no agent or common respace above is used instead to indicate a special address to which correspondence	should be sent.			
Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION				
Statement concerning amendments:				
1. The applicant wishes the international preliminary examination to start on the basis of:				
the international application as originally filed				
l				
the description X as originally filed as amended under Article 34				
the claims X as originally filed				
as amended under Article 19 (together with any accompanying statement)				
as amended under Article 34				
the drawings X as originally filed				
as amended under Article 34				
2. The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.				
3. The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). (This checkbox may be marked only where the time limit under Article 19 has not yet expired.)				
* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.				
Language for the purposes of international preliminary examination: English				
which is the language in which the international application was filed.				
which is the language of a translation furnished for the purposes of international search.				
which is the language of publication of the international application.				
which is the language of the translation (to be) furnished for the purposes of international preliminary examination.				
Box No. V ELECTION OF STATES				
The applicant hereby elects all eligible States (that is, all States which have been designated and which are bound by Chapter II of				
the PCT) excluding the following States which the applicant wishes not to elect:				
CANDIDATE THE STATE OF THE STAT				



Sheet No. 4..



Box No. VI CHECK LIST				
The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:		Examining A	onal Preliminary uthority use only not received	
translation of international application	:	sheets	received	not received
2. amendments under Article 34	:	sheets		
3. copy (or, where required, translation) of amendments under Article 19	:	sheets		
copy (or, where required, translation) of statement under Article 19	:	sheets		
5. letter	:	sheets		
6. other (specify)	:	sheets		
The demand is also accompanied by the item(s) n	narked below:			
1. fcc calculation sheet		<u> </u>	xplaining lack of sign	
2. separate signed power of attorney			ınd or amino acid seq adable form	uence listing in
3. copy of general power of attorney, reference number, if any:		6. other (speci	fy):	
Box No. VII SIGNATURE OF APPLICANT,				
Next to each signature, indicate the name of the person signing	g and the capacity	in which the person signs (if suc	h capacity is not obvious fi	rom reading the demand).
WILSON, Stephen Henry				
For Internation	onal Prelimina	y Examining Authority u	se only	
1. Date of actual receipt of DEMAND:				
Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):				
The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply. The applicant has been informed accordingly.				
4. The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5.				
5. Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.				
For International Bureau use only				
Demand received from IPEA on:				

PATENT COOPERATION TREATY

REC'D 13 SEP 2001

ON REPORT

PCT

NTERNA SNAL PRELIMINARY EXAMINA

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference SHW:LM:FP13346	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).	
International Application No. PCT/AU00/01053			Priority Date (day/month/year) 12 October 1999
International Patent Classification (IPC)	or national classification	n and IPC	
Int. Cl. 7 G01G 019/03			
Applicant	OCIEG PER LEP	•	
FUTURE FIBRE TECHNOLO	OGIES PTY. LTD. et	aı	
This international preliminary Authority and is transmitted to	examination report has to the applicant according	been prepared by this Into the state of the	nternational Preliminary Examining
2. This REPORT consists of a to	tal of 3 sheets, includ	ing this cover sheet.	
X This report is also accom	panied by ANNEXES,	i.e., sheets of the descri	ption, claims and/or drawings which have
been amended and are the Rule 70.16 and Section 6	e basis for this report an 607 of the Administrativ	d/or sheets containing e Instructions under the	rectifications made before this Authority (see e PCT).
These annexes consist of a total			
3. This report contains indications relations	ng to the following item	s:	
I X Basis of the repor			
II Priority			
V X Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;			
citations and explanations supporting such statement			
VI Certain documents cited			
VII Certain defects in the international application			
VIII Certain observations on the international application			
Date of submission of the demand Date of completion of the report			e report
13 March 2001		5 September 2001	
Name and mailing address of the IPEA/AU		uthorized Officer	
AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA			
E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929 JAGDISH BOKIL			
		elephone No. (02) 628	33 2371

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

CT/AU00/01053

I.	Basis of the report		
1.	With regard to the elements of the international application:*		
	the international application as originally filed.		
	X the description, pages 1-53, as originally filed,		
	pages , filed with the demand,		
	pages, received on with the letter of		
	X the claims, pages, as originally filed,		
	pages , as amended (together with any statement) under Article 19,		
į	pages, filed with the demand,		
	pages 54-59, received on 22 August 2001 with the letter of 21 August 2001		
	X the drawings, pages 1/6-6/6, as originally filed,		
	pages, filed with the demand,		
	pages, received on with the letter of		
	the sequence listing part of the description:		
	pages , as originally filed		
	pages, filed with the demand		
	pages, received on with the letter of		
2.	With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.		
	These elements were available or furnished to this Authority in the following language which is:		
	the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).		
	the language of publication of the international application (under Rule 48.3(b)).		
	the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2		
	and/or 55.3).		
3.	With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international		
	preliminary examination was carried out on the basis of the sequence listing:		
	contained in the international application in written form.		
	filed together with the international application in computer readable form.		
ŧ	furnished subsequently to this Authority in written form.		
	furnished subsequently to this Authority in computer readable form.		
	The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.		
:	The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished		
4.	The amendments have resulted in the cancellation of:		
	the description, pages		
	the claims, Nos.		
	the drawings, sheets/fig.		
5.	This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**		
*	Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this		
	report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).		
**	Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report		

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

Claims

International application No.

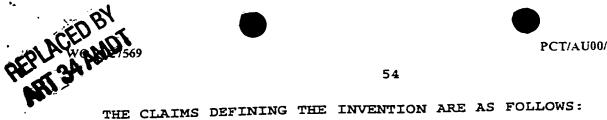
NO

PCT/AU00/01053

v.	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1.	Statement		
	Novelty (N)	Claims 1-28	YES
		Claims	NO
	Inventive step (IS)	Claims 1-28	YES
		Claims	NO
	Industrial applicability (IA)	Claims 1-28	YES

2. Citations and explanations (Rule 70.7)

None of the international search citations discloses or suggests the invention of the independent claims including the feature of a <u>borehole</u> with a vehicle load sensing device being located underneath the roadway as claimed.



- A weigh station for a vehicle in motion on a roadway, 1. including;
- a load sensing device located beneath the surface of 5 the roadway for measuring the load of a vehicle in motion travelling on the roadway above the device; and

processing means for receiving a signal from the load sensing device and for providing an indication of the weight of the vehicle.

- The station of claim 1 wherein the load sensing device is located on a substrate member, the substrate member being of sufficient length to extend substantially entirely across the width of at least one lane of the roadway.
- The station of claim 2 wherein the substrate member 3. comprises an extrusion.
- The station of claim 3 wherein the extrusion comprises a U-shaped channel.
- The station of claim 3 wherein the extrusion 5. comprises a flat beam located within a hollow conduit. 25
 - The station of claim 2 wherein the load sensing 6. device comprises a plurality of electrical strain gauges supported by the substrate member.

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7. The station of claim 2 wherein the load sensing device comprises an optical fibre supported by the substrate member.

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- 5 8. The station of claim 7 wherein, the optical fibre is looped on the substrate member so that a plurality of runs of the optical fibre extend across substantially the entire width of at least one lane of the roadway.
- 10 9. The station of anyone of claims 1 to 7 further including an axle detector for detecting the presence of axles of a vehicle so that an indication of the number of axles of the vehicle can be determined.
- 10. The station of claim 9 wherein the axle detector is arranged on the surface of the roadway and extends across substantially the entire width of at least one lane of the roadway.
- 20 11. The station of claim 9 wherein the axle detector is arranged on the substrate member together with the load sensing device.
- 12. The station of claim 1 wherein the load sensing
 25 device is in a bore beneath the roadway and the bore is
 filled with a filler material after location of the load
 sensing device within the bore.
- 13. The station of claim 1 wherein the load sensing
 30 device includes a sensing fibre which extends
 substantially across the width of at least one lane of the
 roadway, a reference fibre, a coupler for coupling the
 sensing fibre and reference fibre, fibre sensor leads

connected to the coupler, one of the fibre sensor leads being connected to a light source for launching light into the sensing fibre and reference fibre, and the other fibre sensor lead being connected the processing means for receiving light from the fibres and analysing the light to determine the weight of the vehicle.

14. The station of claim 13 wherein the processing means includes a light detector connected to the said other fibre sensor lead, and a third fibre sensor lead connected to the coupler, the third fibre lead being connected to a second detector so that an indication of the weight of a vehicle can be obtained by the detectors based on phase demodulation.

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- 15. The station of claim 9 wherein the axle detector comprises a piezo-electric strip.
- 16. The station of claim 9 wherein the axle detector
 20 comprises a fibre optic linear modelmetric interferometer
 comprising a multi-mode fibre connected to a single mode
 fibre patch chord, the patch chord being coupled to axle
 detector processing means for detecting a change in
 property of light in the multi-mode fibre in response to a
 25 change in the load or strain experienced by the multi-mode
 fibre.
 - 17. The station of claim 16 wherein a light source is provided in the axle detector for launching light into the patch chord and multi-mode fibre.
 - 18. The station of claim 16 wherein the multi-mode fibre has a mirrored end for reflecting light from the mirrored end back through the fibre so that the detector and light

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source are arranged at one end of the multi-mode fibre and patch chord.

- 19. The station of claim 17 wherein the light source is arranged at one end of the patch chord and multi-mode fibre, and the detector at the other end of the multi-mode fibre.
- 20. The station of claim 1 wherein the load sensing
 10 device includes a single-mode sensing fibre including a
 Bragg grating, the single-mode fibre being connected to a
 single-mode fibre lead which is coupled to a coupler, the
 coupler having one arm connected to a light source and a
 further arm connected to a detector.

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- 21. The station of any one of claims 1 to 20 wherein the load sensing device is located between 500 and 1000 mm below the surface of the roadway.
- 20 22. A method of forming a weigh station for vehicles, including the steps of;

locating a load sensing device beneath the surface of the roadway;

- coupling the load sensing device to a processor for receiving signals from the load sensing device to enable those signals to be processed to provide an indication of the weight of a vehicle travelling on the roadway above the load sensing device.
- 30 23. The method of claim 22 wherein the step of locating the sensing device beneath the roadway comprises boring a hole beneath the roadway and locating the load sensing device within the bored hole.

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- 24. The method of claim 22 wherein the step of locating the sensing device beneath the roadway comprises digging a trench across the roadway, locating the load sensing device within the trench and filling the trench and restoring the roadway above the load sensing device.
- 25. The method of claim 23 wherein the step of forming the bore hole beneath the roadway comprises the step of forming an entry ditch or trench beside the roadway to enable access of a boring device for boring the borehole beneath the roadway.
- 26. The method of claim 25 wherein the entry ditch or 15 trench is restored to original form to render invisible the weighing station beneath the roadway.
- 27. A load sensing device for a weigh station which measures the weight of a vehicle whilst the vehicle is in 20 motion on a roadway, the load sensing device including;

a substrate member; and

an optical fibre supported on the substrate member, the substrate member and optical fibre being of sufficient length to extend substantially across the entire width of at least one lane of a roadway.

28. The device of claim 27 wherein the device is connected to a processor which includes a light source and a detector, the light source being for launching light into the fibre and the detector being for detecting light from the fibre, the processor being for processing signals from the detector to determine, from a change in the characteristic of the signals, the weight of a vehicle travelling over the sensor.

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29. The device of claim 28 wherein a single run of the fibre is arranged on the substrate member.

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- 5 30. The device of claim 28 wherein the fibre is looped on the substrate member so that a plurality of runs of the fibre extend along the length of the substrate member.
- 31. The device of claim 27 wherein the substrate member comprises a generally U-shaped channel member having a base and two side walls, the fibre being supported on the base of the U-shaped channel member.
- 32. The device of claim 27 wherein the substrate member comprises a beam arranged within a hollow conduit, the fibre being arranged on the beam.
 - 33. A method of weighing vehicles in motion on a pavement surface, including the steps of:
- providing a load measuring device which respond to
 the load applied by the vehicle as the vehicle passes over
 the location of the device, the load measuring device
 being installed in a borehole and under the pavement
 surface and extending across at least one lane of the
 pavement surface;

providing an axle detector in order to determine the number of axles on the vehicle;

acquiring output signals from the load measuring device and the axle detector as a vehicle passes over the load measuring device and axle detector;

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analysing the signal characteristics to determine vehicle information including the weight and number of axles of the vehicle; and

recording the vehicle information in a system database or displaying or transmitting the vehicle information locally and/or remotely.

- 34. A method for installing a weigh in motion load sensing device, comprising the steps of:
- producing a substantially horizontal borehole across pavement lane(s) of a roadway using a boring techniques;

inserting load sending device into the borehole;

filling the remaining borehole void with filler

15 material;

protecting sensor leads extending from the device; and

restoring the site of borehole entry to render the site invisible to vehicle operators.

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35. The method according to claim 34 further including the step of providing an axle detector for determining the number of axles associated with a vehicle the weight of which is to be determined by the load sensing device.

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36 The method of claim 35 wherein the axle detector is also inserted into the borehole.